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# THE GEOLOGICAL TURN

## Narratives of the Anthropocene

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Stories matter for the Earth. Indeed, the stories that the elites of industrial modernity have told themselves – about nature as external and purposeless, about the world as resource, about human exemptionalism, about progress and freedom as an escape from nature's determinations and limits, about technology as quasi-autonomous prime mover – have served as the cultural origins and conditions of the Anthropocene (Merchant 1980; Descola 2013; Bonneuil and Fressoz 2015). In the same way the kind of stories we tell ourselves today about the Anthropocene can shape the kind of geohistorical future we will inhabit.

William Cronon's seminal reflections on environmental history as storytelling provide insights for the study of Anthropocene discourses. His famous 1992 article, 'A place for stories: Nature history and narrative', compared the ways several historians told of the transformations of the Great Plains from the mid-19th century to the mid-20th century, which included the dramatic Dust Bowl event. Some narratives were progressive, others declinist. The former tended to deprecate the Indians' managed prairies as a 'stagnant pool' or 'inhabited wilderness' and [illegible]ved wheatfields and railways as improvement; the latter insisted that the Great Plains could not support the demands of greedy settlers and capitalists. The former front-staged settlers' efforts and technologies to tame a resistant and unproductive nature, while the latter emphasized the need for state-led sound ecological management, exemplified by the Dust Bowl.

Similarly, writing the history of the Earth and its inhabitants is always telling a story, a narrative. This entails:

- attributing a certain value to the state of the things at the beginning and at the end of the story;
- selecting a focus and a 'framing' that highlights some actors and phenomena while leaving others in the shadows;

- putting time into sequences, pinpointing certain periods, turning points and key forces, while downplaying others; and
- all this constituting a dramaturgy with implicit or explicit causal factors, with implicit or explicit moral lessons.

If nations, races and classes have for a long time been the objects of countless narratives, the Anthropocene has become, as we shall see, the object of various 'geo-stories', to use the term coined by Latour (2013). Anthropocene science is much more than just stories, but it is stories too. The very first Anthropocene papers from Paul Crutzen in 2000 and 2002 contained also a narrative about how 'we', 'humanity', got here. Steffen et al. (2011a) proposed both a scientific characterization of the Anthropocene and an explicit historical perspective. Following natural scientists' pioneering narratives, historians, philosophers, social scientists, journalists, politicians, think-tanks and activists have woven stories of the Anthropocene. Each tells a tale of 'how we got here', containing (in the double meaning of the word, allowing and framing) a narrative about the future, about the actors, issues and solutions are most relevant. Here I will examine four grand narratives of the Anthropocene: (1) the naturalist narrative, currently the mainstream one; (2) the post-nature narrative; (3) the eco-catastrophist narrative; and 4) the eco-Marxist narrative.

## From hunter-gatherers to global geological force: The naturalist narrative



At the heart of the publications by leading natural scientists such as Paul Crutzen and Will Steffen, as well as in historical writings from John McNeill and Dipesh Chakrabarty, lies a particular storytelling that has now become the dominant Anthropocene discourse in the mainstream scientific and media arenas (Crutzen 2002; Steffen et al. 2011a, 2011b). This story line – widely echoed in popular books and magazines – may be summarized as follows.

> Since about 1800, 'we', the human species, have inadvertently altered the Earth system at a geological scale. *Anthropos* did so through three stages that can best be documented through quantitative global environmental data. The key causal forces are population growth, economic growth and expansion of international exchange. But a revolution (to be compared only to the Copernican or Darwinian revolutions) occurred recently: Earth system scientists have made *anthropos* aware, at last, of the danger. And, if only policy-makers would act on the basis of sound science, these scientists have the knowledge to lead humanity towards a sustainable future.

This narrative entails four key interrelated claims: (1) the front-staging of 'the human species' as the undifferentiated causal force changing the Earth; (2) the recency of environmental consciousness thanks to Earth monitoring science, breaking with centuries of a modern dark age of unconscious impacts; (3) the erasure of civil

society and laypeople as producers of environmental knowledge and solutions associated with a self-celebration of scientists as shepherds of humankind and of Earth; and (4) the need for more science and green technologies to save the planet.

### *Who is the anthropos of the Anthropocene?*

The mainstream narrative of the Anthropocene is straightforward: this is the story of a species that evolved 'from hunter-gatherers to global geologic force' (Steffen et al. 2011b, 741). The 'human–environment interaction' is said to have started 'a few million years ago' when an early *Homo* genus mastered fire and tools allowing for a protein-rich diet that 'gave humans the largest brain-to-body ratio of any animal on the Earth' (Steffen et al. 2011a, 846). That paved the way for the emergence of language and civilisation. But, the story continues, 'the human enterprise' still had little impact on Earth until the end of the 18th century when the massive use of fossil fuels transformed the atmosphere, oceans and climate at a global scale. This new energy source increased immensely humankind's power to transform the ecosystems of the world and the vital biogeochemical cycles, provoking a geological derailment of our planet, the more so since the post-1945 'Great Acceleration'. After having been an unconscious 'telluric force' in the first two centuries of the Anthropocene, humankind must now enter a wiser era of 'planetary stewardship'. To help and light up this new path to come, the story goes on:



> Understanding the trajectory of the human enterprise from our long past as hunter-gathers to the Great Acceleration and into the twenty-first century provides an essential context for the transformation from resource exploitation toward stewardship of the Earth System. (Steffen et al. 2011b, 746; see also Chakrabarty 2009)

In this Grand Narrative 1, the Anthropocene is therefore more than the name of an epoch in which humankind has become a geological force (the naming practice is an anomaly in the stratigraphic nomenclature: until now, geological divisions were named after their main flora and fauna composition, not after any causal agent). The Anthropocene is not only 'Man's' moment in the history of the Earth; it is also the species' moment in the understanding of human history. A biological category, the 'species' or the 'population', rather than specific social groups bearing situated cultural values and taking particular socio-economic and technical decisions, is elevated to a causal explanatory category in the understanding of human history. A landmark Anthropocene article contains no less than 103 uses of 'Mankind', 'humankind', 'humans', 'humanity', 'our species' or the adjective 'human' – as in 'human influence', 'human enterprise' and so on (Steffen et al. 2011a). This framing of history as the ambivalent odyssey of Man from hunter-gatherer to telluric force, as the epic confrontation between the 'human species' and the 'Earth system', has impressed influential scholars in the humanities and social sciences. Typical of the current geological turn, John McNeill's pioneering

and outstanding environmental history of the twentieth century, *Something New Under the Sun*, allocates no more than 30 of 420 pages to 'ideas and politics', while describing at length transformations of the atmosphere, biosphere and other components of the Earth system (McNeill 2000). Similarly, another major historian, Dipesh Chakrabarty, has crowned the biological 'species' (the word appears 51 times in his *Critical Inquiry* article; Chakrabarty 2009) and 'population' categories as the major ones in writing 'the history through which we have evolved to be the dominant species of the planet' (Chakrabarty 2014, 132). In the story of a global 'we', humans – 'thanks to our numbers, the burning of fossil fuel, and other related activities – have become a geological agent on the planet' (Chakrabarty 2009 209), a story that yields to the Anthropocene's official and naturalistic grand narrative of an undifferentiated humanity uniformly concerned by and responsible for global environmental change.

Clearly, the Anthropocene (which, Chakrabarty noted, annihilates the modern natural history/human history disjunction) disproves human exemptionalism, the nature/culture dualism framing nature as 'a domain of objects that were subject to autonomous laws that formed a background against which the arbitrariness of human activities could exert its many-faceted fascination' (Descola 2013), and the social-only conception of society, each of which have dominated the humanities and social sciences since the dawn of western industrial modernity, and represent cultural drivers of the advent of the Anthropocene. But should we throw out the humanities' baby – its sophisticated critical conceptual apparatus – with the industrial-modern bath water, as the naturalist narrative does?



The naturalising, species-centered Narrative 1 obscures the asymmetries among humans *about* nature – unequal access to environmental goods and exposure to environmental bads – and *through* nature – technical systems organise energy and material flows which co-produce a certain kind of 'second', transformed, nature together with a certain kind of social order, entailing unequal social, racial, gender and geopolitical relations. They are overlooked as secondary compared to the global ecological crisis and the sublime of the Anthropocene's politics of scale. However, key researches in political ecology, environmental history, ecological economics and other interdisciplinary environmental studies have illuminated these socio-ecological asymmetries and how they can generate development pathways that are both ecologically unsustainable and socially unequal (Pomeranz 2000; Peet, Robbins and Watts 2010; Hornborg 2013). In neglecting this evidence and subsuming differentiated environmental responsibilities and sufferings into an undifferentiated 'we, the human species', Narrative 1 has been criticised as an ideology telling a geo-story as if 'human impact' on the Earth were not the result of technical, cultural and economic choices made (unevenly) by specific social groups, organisations and institutions. Thus

> the Anthropocene might be a useful concept and narrative for polar bears and amphibians and birds who want to know what species is wreaking such havoc on their habitats, but alas, they lack the capacity to scrutinize and

> stand up to human actions. Within the human kingdom, on the other hand, species-thinking on climate change is conducive to mystification and political paralysis. (Malm and Hornborg 2014, 6)

Indeed, a serious analysis of the causal chain that led to the current climate disruption cannot separate the curve of greenhouse gas emissions from the historical making of a certain kind of social order, one that entails power asymmetries with a small percentage of humans, a few countries and a few companies accounting for most emissions. It is a social order with a specific kind of political system (cf. the notion of 'carbon democracy', Mitchell 2011) and with those people most affected having had no voice in the economic and technical decision-making that shifted the Earth into the Anthropocene. Narrative 1 tends to explain the current geological shift as an unintentional effect of the 'enterprises' of a black-boxed undifferentiated species, a consequence originally of the human mastery of the fire some hundred thousand years ago, or even – the naturalization of the Anthropocene being here pushed to its outer limits – of 'the planet's own pyrophytic tendencies', the Earth's own 'combustive imperative' of which 'the recent propensity to tap into sedimented and fossilised biomass is the latest' (Clark 2012, 269).

Clearly, a smarter and subtler Anthropocene studies curriculum is to be recommended, if not for polar bears then at least for those humans who seek scientifically more explanatory (and politically more helpful) socio-ecological dynamics than the black box of the 'human species'. In such a curriculum, the 'anthropos' that triggered and triggers the Anthropocene is not a merely biological agent but the product of complex belief systems, socio-technical trajectories and political-economical dynamics.



### *A new global environmental consciousness?*

'We are the first generation with the knowledge of how our activities influence the Earth System' (Steffen et al. 2011b, 749). So goes the standard narrative: our forefathers embarked on the industrial revolution, the fossil fuel age, the age of empire and the atomic age without knowing the global environmental consequences. Even in the decades after the Second World War 'the emerging global environmental problems were largely ignored' (Steffen et al. 2011a, 850). Our allegedly recent and 'growing awareness of human impact on the environment at the global scale' is an essential trait of the third stage of the Anthropocene (Steffen et al. 2011a, 856). 'By changing the environment we have *unknowingly* declared war on Gaia', as James Lovelock puts it (2006, 13, my emphasis). Grand Narrative 1 declares: 'Earth, forgive us. Once we ignored you, but now we know'. Social theorists such as Ulrich Beck and Anthony Giddens have also yielded to this progressist storyline – from darkness to light, from simple modernity to a second, reflexive modernity.

However, much recent historical evidence shows that past societies were neither unknowing nor unreflexive; nor were they free from risk controversies about the global environmental impact of their activities. First, right after the Second World War, the rational management of the biosphere became a concern in bestselling

books. It was also a major geopolitical and Cold War issue (Robertson 2012; Bonneuil and Mahrane 2014). Secondly, the age of empires was not a *tabula rasa* of environmental knowledge and warnings. Western elites, seeking to establish their control over the globe – their 'civilizing mission' – bemoaned the inefficient and destructive use of the environment by indigenous people and colonized peasant communities (Bonneuil 1997; Drayton 2000; Anker 2001). Western science promised both a more intensive and a more sustainable use of the world's resources. 'Faced with the consequences of over-exploitation, the "civilized" become aware of their abuses and embark on "rational" exploitation' argued Pierre Clerget in 1912 in *L'exploitation rationnelle du globe* (Bonneuil 1997, 77). It was on the basis of his allegedly superior environmental reflexivity and scientific mastery of nature that the white man justified the 'rational exploitation of the globe'. This green, 'sustainable' imperialism was sometimes contested by rural communities in colonial peripheries (Guha 1989a) as well as by some occidental scientists. In 1913 the Director of the Paris Museum of Natural History asked: 'Do we have the right to monopolize the Earth for us alone and to destroy for our own profit to the detriment of generations to come' (Perrier 1913, 210).

Thirdly, global environmental knowledge, reflexivity and controversy were present at the very beginnings of industrialism. In the late 18th century a theory of global climatic changed driven by human action (deforestation) was well established. Buffon observed that 'the entire face of the Earth bears the imprint of Man's power', which was for him good news since Man, through wise management of the Earth, will 'modify the influences of the climate he lives in and set, so to say, the temperature to the convenient point' (quoted in Bonneuil and Fressoz 2015, 18). But in a context of rapid deforestation and environmental degradation in Western Europe and its American colonies, other scientists predicted less controlled and less favourable global climatic changes. From 1780 to 1840, their work was widely debated and stimulated government initiatives and parliamentary debates (Locher and Fressoz 2012). The early socialist thinker Charles Fourier was not alone when he argued in 1821 that industrial capitalism, if unbound, would alter the entire Earth and its climate (Bonneuil and Fressoz 2015, 227–9). The dawn of the Anthropocene was characterised by a strong reflexivity and knowledge of the intricate links between human activities, human health, good government and the environment (Fressoz, this volume).

In sum, the standard narrative purporting that until recent decades there existed only knowledge about local environmental impacts but no systematic knowledge of global environmental changes does not hold serious historical investigation. If we cease to view the shift into the Anthropocene as an unconscious process, our task is not to understand how global environmental knowledge progressed from original darkness to present awareness, but rather how we entered the Anthropocene *in spite of* rich and global environmental reflexivity. Echoing the growing body of work on 'agnotology' in science studies, the quarter-millennium-long history of the Anthropocene might then be better understood as the history of political and techno-scientific strategies to govern and channel fears and oppositions, and to disinhibit Anthropocenic

agency from initial environmental cautiousness (Bonneuil and Fressoz 2015). For sure, scientific knowledge of the Earth as a system has advanced. But in erasing the environmental knowledge and intense socio-ecological struggles of the dawn of industrial times, Grand Narrative 1 depoliticizes our past *and present* situation.

### *A tale of scientific shepherds and green geo-technologies*

The view of science slowly lifting the veil of past environmental blindness that pervades Anthropocene Narrative 1 has powerful political implications. It stages science as the *deus ex machina* that was not part of the cultural–political–economical nexus that made the Anthropocene, but which will now guide humankind and save the planet. As Crutzen remarks:

> A daunting task lies ahead for scientists and engineers to guide society towards environmentally sustainable management during the era of the Anthropocene. This will require appropriate human behaviour at all scales, and may well involve internationally accepted, large-scale geo-engineering projects, for instance to 'optimize' climate. (Crutzen 2002, 23)

This narrative pictures society as ignorant, passive and stuck in 'cognitive dissonance'. Key scientific publications carefully avoid reference to any socio-environmental struggle past or present (such as anti-extractivist campaigns from Alberta to Amazonia) and to any bottom-up initiative (such as the Transition Town, Degrowth or *Buen vivir* movements), as if environmental awareness, initiatives and solutions were only on the side of science rather than flourishing in civil societies. In this telling, the solutions are clear – scientists must take the lead and conjure up new green technologies.



> Given the nature of the problems arising in the Anthropocene, it is little wonder that political leaders, policymakers and managers are struggling to find effective global solutions. There are, however, some innovative approaches. Active adaptive management . . . early warning systems . . . model[ing] complex system dynamics . . . geo-engineering [sulphur particles] (Steffen et al. 2011a, 856–9)

In short, Narrative 1 tends to reproduce the grand narrative of modernity, that of Man moving from environmental obliviousness to environmental consciousness, of Man equaling Nature's power, of Man repairing Nature.

## Repairing Frankenstein's monster: The post-nature grand narrative

Promoted by a heterogeneous network of post-modern, eco-constructivist philosophers, natural scientists, and pro-industry, techno-utopian think-tanks, Grand

Narrative 2 heralds the Anthropocene as the end of Nature. Its more ardent advocates promise a world without nature in a 'good Anthropocene'.

While modernity had promised to emancipate society from nature's determinism, the Anthropocene proclaims the inescapable immersion of human destiny in the great natural cycles of the Earth, and the meeting of the temporalities of short-term human history and long-term Earth history that had been viewed as separated for the last two centuries. This reading argues for the impossibility of continuing to separate 'nature' and 'society'. It shakes the whole architecture of our modern knowledge system and our higher education because of the latters' big divide between the 'two cultures' of (anti-social) natural sciences and (anti-natural) social sciences and humanities.

Narrative 2 shares – and even radicalises – the Promethean tropes of the first grand narrative as well as the belief that environmental awareness or reflexivity is very recent, so that in the past the moderns did not really understand the entangled nature of their interaction with nature. But it departs from Grand Narrative 1 in viewing the Anthropocene as a story of feedback loops, connections, networks and hybridity that cut across most of modernity's boundaries. The new epoch is celebrated as the end of the separation between fact and values constitutive of modern science. It is the end of certainty and the rise of risk, uncertainty and controversy, of socially robust 'mode 2' science. Latour even made us realize that we have never been modern and that science in action is always the negotiation of new hybrid arrangements of nature and society (Latour 2004). By acknowledging our thousands of entanglements with nature, the story goes, our modernity, once non-reflexive about its risks and environmental impacts, becomes 'reflexive', as Beck and Giddens put it. Our knowledge is progressing, as in Narrative 1, so this story is nothing but another avatar of the grand narrative of progress and enlightenment (Fressoz 2007).



At a deeper level, the Anthropocene is welcomed as the end of nature itself. In Latour's philosophically sophisticated version, this means the end of 'Nature 1', uniform and history-less from the atom to the cosmos (Latour 2013). Less sophisticated perspectives argue that there is no such thing as 'wilderness', for humans have always shaped nature. The critique of 'wilderness' previously came from indigenous rights activists and postcolonial and postmodern social scientists (Guha 1989b; Cronon 1996; Descola 2013). Now it is voiced by influential natural scientists and industry representatives. For Peter Kareiva, Chief Scientist for the Nature Conservancy, and his co-authors: 'One need not be a postmodernist to understand that the concept of Nature, as opposed to the physical and chemical workings of natural systems, has always been a human construction, shaped and designed for human ends' (Marvier et al. 2012).

Once made mainstream, the idea that external or pristine nature does not exist and that nature is always a cultural and technological construct has become the battle flag of:

> a new environmental movement – sometimes called eco-modernism, other times eco-pragmatism – that offers a positive vision of our environmental

> future, rejects Romantic ideas about nature as unscientific and reactionary, and embraces advanced technologies, including taboo ones, like nuclear power and genetically modified organisms, as necessary to reducing humankind's ecological footprint. (Shellenberger and Nordhaus 2014)

The end of nature thesis, accusing earlier environmentalism of romantically idealising a pristine nature that exists apart from people, and of irrationally rejecting technology as a fix to save the planet, has now become a major storyline for a variety of constructivist-demiurgic projects – the transhumanist project to re-engineer the human species, the (Marxist) accelerationist project to unleash technology's productive forces from capitalist and neoliberal constraints, and the geo-constructivist project of eco-pragmatists, notably at the Breakthrough Institute, to achieve a technical stewardship of the Earth as a whole (Neyrat 2015).

In Narrative 2 eco-pragmatists don't dispute the ecological disruptions associated with the Anthropocene. But nor do they see them as a failure of the modern project to control nature. Several eco-pragmatists promote the 'early Anthropocene thesis' asserting that humans took control of the planet several thousand years ago with the development of agriculture, hence downplaying the radical shift associated with the industrial mode of production and consumption (Shellenberger and Nordhaus 2011, 10). As the eco-pragmatist geographer Erle Ellis argues:



> Recognition of human's huge and sustained influence is now leading to a wholesale rethinking of ecological science and conservation that moves away from humans as recent destroyers of a pristine nature and towards humanity's role as sustained and permanent stewards of the biosphere. (Ellis 2013, 32)

So eco-pragmatists do not see the Anthropocene as demanding more humility and caution towards the Earth. Rather, they radicalise the Baconian project to artificialise evermore the Earth. In his book *The God Species*, Mark Lynas declares: 'Nature no longer runs the Earth. We do. It is our choice what happens here' (Lynas 2011, 8). For Grand Narrative 2, Nature is dead; everything is human-constructed. There is no alterity, and no limit to the cornucopian dream to engineer the planet into a New Atlantis (Hamilton 2013). As Erle Ellis proclaims: 'We will be proud of the planet we create in the Anthropocene' (quoted in Hamilton 2013, 204). In this narrative, 'we' (the same undifferentiated 'anthropos' as in the mainstream narrative) are the pilots of a hybrid techno-nature.

While criticizing the modernisation project and viewing the Anthropocene as a refutation of modernity, Bruno Latour, together with Breakthrough Institute's eco-pragmatists, urges us to 'love our monsters'. He reads Mary Shelley's *Frankenstein* not as a cautionary tale against technological hubris, but rather against irrational fears in the face of technology's side effects. Dr Frankenstein failed not because he created a monster but because he fled in horror instead of repairing and improving him: 'The sin is not to wish to have dominion over nature', goes the story, 'but to believe that this dominion means emancipation and not attachment' (Latour 2011, 24).

Rather than departing from the ideology of dominating nature by technology – a proposition dismissed as 'nihilistic ecotheology' by Shellenberger and Nordhaus (2011, 13) – or appealing to the precautionary principle – portrayed as a 'legal, epistemological monster' by Latour (2011, 23) – this reading normalizes technological risks as a necessary part of the human condition.

> Each new act of salvation will result in new unintended consequences, which will in turn require new acts of salvation. What we call 'saving the earth' will, in practice, require creating and recreating it again and again for as long as humans inhabit it. (Shellenberger and Nordhaus 2011, 9–10)

The post-nature narrative is therefore paradoxical: in claiming the end of nature as an external thing it abandons the central cosmo-vision of western modernity. It challenges the modern conception of freedom as an escape from nature and its limits. From this perspective, Bruno Latour, Donna Haraway, Vinciane Despret, Peter Sloterdijk and Isabelle Stengers, among others, have opened important philosophical avenues for elaborating on how to rethink freedom beyond unbound-ness, how to give political existence to the non-humans we care for and are bound to.

But in refashioning nature as a flexible hybrid amenable to further market and technological deconstruction-reconstruction, and in claiming that 'we' understand better the very nature of nature in a way past societies could not see, the post-nature narrative intensifies and accelerates modernity. It constitutes the new spirit of modernity, based on a hybridist, relational and connectionist ontology rather than a substantial one (Bonneuil 2016).



## Tipping points and dystopian collapse: The eco-catastrophist narrative

A third grand narrative may be called eco-catastrophist. Rather than Gaia, its mythological figure of the Earth is Medea, she who went so far as to kill her own children when she was betrayed by her husband Jason. The myth provides an analogy for the collapse of industrial civilization, with humans devoured by the Earth they betrayed. In the telling of Grand Narrative 3, the move into the Anthropocene is a long story of unsustainable practices, resource depletion, transgressed 'planetary boundaries', and increased complexity creating new vulnerabilities paving the way to tipping points and a planetary state shift (Barnosky et al. 2012; Diamond 2005; Tainter 1988).

The eco-catastrophist narrative views the Anthropocene as an age in which modernity's project of indefinite growth and progress hits the wall of the planet's finitude. Earlier eco-catastrophist warnings, such as the *Limits to Growth* report of 1972, focused on resource depletion, on the limits of the Earth in terms of *stocks*. But there are on Earth enough fossil resources to warm the planet more than 12°C in 2300, as in IPCC's worst-case scenario. Earth systems science and Anthropocene research have therefore added new arguments focusing on *flow* limits of the Earth, that is, the limited capacity of Earth biogeochemical processes to buffer human-accelerated cycles of carbon, water, phosphorus, nitrogen and so on.

This reflects a move towards a more dynamic systems thinking perspective from ecology and Earth system science. The eco-catastrophist narrative draws on these new approaches, developed in the wake of Canadian ecologist C. S. Holling's work on the cyclical development of ecosystems – growth, collapse and reorganisation. Resilience is the capacity of a system to endure such processes without losing its key features and functions. Articulated by mainstream institutions such as the Resilience Alliance, this systems perspective has also been appropriated by socio-ecological movements such as permaculture, Transition Towns and the degrowth movement. Whether articulated by scientists, policy makers or activists, a feature of this discourse is its non-linear and non-progressist conceptualization of time and history. While Grand Narratives 1 and 2 rest on a progressist regime of historicity, the eco-catastrophic narrative depicts us not as moving towards the better (better lives, better knowledge, better dominion over nature) but towards limits, tipping points, collapse, violence and wars. In this perspective, contrary to the bright future promised by progressive ideologies of all kinds (from liberals to Marxists, see Hamilton, this volume), political discourse should not avoid speaking collapse to the masses (Hamilton 2010). Acknowledging the possibility of a collapse of the industrial way of life and accepting the limits to growth becomes, in Grand Narrative 3, an opportunity for a more participatory politics and a new post-growth resilient society where life would be based on a lower and simpler material and energetic base, but with more enjoyable, meaningful and egalitarian communities (Semal, this volume). Unlike Narratives 1 and 2, the third tends to look to the local level, where communities make life together, rather than the global one, as the relevant political level to democratically plan such a transition (Hopkins 2008).



While drawing on the first two narratives' scientific knowledge about the state shift of the Anthropocene, and harnessing in a similar way the authority of science to ground its warnings, the eco-catastrophist narrative departs from their faith in new greener technologies to save the planet. It argues for the urgent need to radically change the dominant ways of living, consuming and producing, and rejects the belief in technological fixes that would save the planet within the frame of an unchanged socio-economic system. In the wake of Lewis Mumford, Ivan Illich and E. F. Schumacher's proposals for democratic technologies, it puts forward low-tech – though high-intelligence – solutions (such as permaculture, economic re-localisation, and local community-owned renewable energy) over high-tech solutions (such as transgenic crops, nanotechnology and geoengineering). In the eco-catastrophist Anthropocene narrative, science and technology alone cannot 'save the planet'; environmental reflexivity and social innovations will rather emerge from a dynamic civil society (Hopkins 2008).

## The Capitalocene: The eco-Marxist narrative

Grand Narrative 4 can be called eco-Marxist. While Marx theorised on the first contradiction of capitalism, its inability to reproduce the labour force, the eco-Marxist narrative sees the Anthropocene as a result of a second contradiction of

capitalism, its inability to maintain nature. The Anthropocene is therefore a story of the unsustainable metabolism of the capitalist 'world-system' within the Earth system (Foster et al. 2010). The concept of world-system was elaborated in the 1970s by Immanuel Wallerstein to account for both the internationalisation of the economy and the asymmetries and division of labour within it (Wallerstein 2004). Rather than the species, *capital* is seen as the driver. Indeed, the value of capital has increased about 134-fold since 1700 while human population has increased about 10-fold (Bonneuil and Fressoz 2015). According to Grand Narrative 4, instead of undifferentiated population and economic growth, processes of dispossession and commodification associated with the logic of capitalist expansion, along with the mechanisms of imperial domination, are the essential causal forces of the geological turn. Some prefer to call the new epoch the 'Capitalocene' and consider it started in 16th century with European capitalist expansion (Moore 2015).

It is well known that the rise of industrial capitalism is correlated with a divergence in wealth between nations and social groups. The world's poorest 20 per cent received 4.7 per cent of world income in 1820, but only 2.2 per cent in 1992. Over the same period the share of the top 10 per cent jumped from 43 to 53 per cent (Bourguignon and Morrisson 2002). But is there any causal link between the history of this global economic divergence and the history of the human species as a telluric force? Most natural and social scientists voicing Narratives 1, 2 or 3 have tended to focus only on the final and undifferentiated 'human impact' while implicitly 'black-boxing' the second thread of history. Among them, Dipesh Chakrabarty's argument has the merit of explicitly separating social history from the ecological disruptions of the Earth system.



> It is, ironically, thanks to the poor – that is, to the fact that development is uneven and unfair – that we do not put out even larger quantities of greenhouse gases into the atmosphere than we actually do. Thus, logically speaking, the climate crisis is not inherently a result of economic inequalities – it is really a matter of the quantity of greenhouses gases we put out into the atmosphere that in itself is indifferent to human dramas. Those who connect climate change exclusively to historical origins/formations of income-inequalities in the modern world raise valid questions about historical inequalities; but a reduction of the problem of climate change to that of capitalism . . . only blinds us to questions of human agency that climate scientists – working with visions of pasts and futures on much larger scales – often bring to the fore: our agency as a species or a geophysical force over a period of time much longer than that of capitalism. If we see climate change primarily as a symptom of what's wrong with the capitalist mode of production . . . this analytical strategy is ultimately blind to the inter-twining of human histories with the larger history of the planet and of our place in that history. (Chakrabarty 2014, 123–4)

Is the Earth–humankind drama separated from and indifferent to the intra-human drama? Paradoxically, this 'indifferentialist' view re-enacts precisely the modern

divide between the 'natural' and the 'social' that the Anthropocene disproved. The eco-Marxist narrative emphasises that the technical, economic and social trajectories taken by the core countries of the world-system could not have occurred had they not benefitted from unequal exchange with the dominated regions. Economic historian Kenneth Pomeranz's path-breaking work (2000) has shown that the control of millions of American 'ghost hectares' – the slave-produced cotton imported by England in 1830 that saved 9.3 million domestic hectares of pasture and hay for production of an equivalent amount of fibre from sheep's wool – played a major role in Britain's economic take-off. In 1850, exchanging on the world market £1,000 worth of cotton manufactures for £1,000 worth of raw cotton, Britain gained over 46 per cent in terms of embodied labour and about sixty times ~~the area of land~~ (Hornborg 2013, 85-91). Extending this idea of an unequal embodied land exchange, other works have documented the ecological debt of western industrial countries, an 'unequal ecological exchange' through which, in the last two or three centuries, the core countries of the world-system imported more embodied land, more high-quality energy and more material from periphery countries than they exported to them, while exporting more environmental load, waste and entropia to them (Fischer-Kowalski et al. 2014; Tukker et al. 2014; Moore 2015). These works, combining the world-system perspective (understanding uneven global intra-human relations) and Earth system perspectives (tracing and quantifying global material and energy flows in the Anthropocene), suggest that the category of world-system might be more fertile than the species category for productive interdisciplinary work between natural and social sciences.



## Conclusion

The point here is not to choose the single best grand narrative for our geohistorical shift. (One could add an eco-feminist perspective as well as many subaltern and non-western narratives). Each illuminates different aspects in valuable ways and each has its limitations. We need a plurality of narratives from many voices and many places, rather than a single grand narrative from nowhere, from space or from the species. Putting the array of narratives on the table in a reflexive and comparative manner helps to think our new geo-historical epoch rather than being predetermined as Anthropocene (species) subjects. It opens the black boxes of the Anthropocene discourse and repoliticises them.

Diffracting histories and stories helps us reflect on 'who we want to inherit from' (as Isabelle Stengers would put it) in the geo-historical drama of the last quarter-millennium. Which imaginary of nature and of the Earth do we highlight as scientists and scholars? Which subjectivation of the 'anthropos' are we promoting? Are 'anthropos' passive and non-knowing subjects who need to be enlightened and overseen by a techno-scientific elite or are they concerned and active Earth commoners who hold in their reflexive minds, in their creative hands, and in their socio-environmental struggles and initiatives some of the 'solutions' for lives of dignity in the Anthropocene? What role for science, technology and

the market do we insert into our stories about the Anthropocene? The various Anthropocene narratives we tell are performative; they preclude or promote some kinds of collective action rather than others, and so they make a difference to the becoming of the Earth.

## References


Anker P 2001 *Imperial Ecology: Environmental Order in the British Empire, 1895–1945* Harvard University Press, Cambridge MA

Barnosky A D et al. 2012 Approaching a state shift in Earth's biosphere *Nature* 486 52–8

Bonneuil C 1997 Crafting and Disciplining the Tropics: Plant Science in the French Colonies in Krige J and Pestre D eds *Science in the Twentieth Century* Harwood Academic, Amsterdam 77–96

Bonneuil C 20[illegible]e nature liquide? Les discours de la biodiversité dans le nouvel esprit du capitalisme, in Thomas F and Boisvert eds *Le pouvoir de la biodiversité* Presses de l'IRD, Bondy

Bonneuil C and Fressoz JB 2015 *The Shock of the Anthropocene: The Earth, History and Us* Verso, London

Bonneuil C and Mahrane Y 2014 Gouverner la biosphère in Pestre D ed *Gouverner le progrès, gouverner ses dégâts* La Découverte, Paris 133–69

Bourguignon F and Morrisson C 2002 Inequality among world citizens: 1820–1992 *American Economic Review* 92(4) 727–44

Chakrabarty D 2009 The climate of history: Four theses *Critical Inquiry* 35(2) 197–222

Chakrabarty D 2014 Quelques failles dans la pensée sur le changement climatique, in Hache E ed *De l'univers clos au monde infini* Dehors, Paris 107–46

Clark N 2012 Rock, Life, Fire: Speculative Geophysics and the Anthropocene *Oxford Literary Review* 34(2) 259–76

Cronon W 1996 The trouble with wilderness: or getting back to the wrong nature, in Cronon W ed. *Uncommon Ground: Rethinking the Human Place in Nature* Norton, New York 69–80

Crutzen P J 2002 Geology of mankind *Nature* 415 23

Davis M 2001 *Late Victorian Holocausts: El Niño famines and the making of the Third World* Verso, London

Descola P 2013 *Beyond Nature and Culture* University of Chicago Press, Chicago

Diamond J 2005 *Collapse: How Societies Choose to Fail or Succeed* Viking Penguin, New York

Drayton R H 2000 *Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World* Yale University Press, New Haven

Ellis E C 2013 Using the planet *Global Change* 81 32–5

Fischer-Kowalski M Krausmann F and Pallua I 2014 A sociometabolic reading of the Anthropocene *The Anthropocene Review* 1(1) 8–33

Foster J Clark B and York R 2010 *The Ecological Rift: Capitalism's War on the Earth* Monthly Review Press, New York

Fressoz J-B 2007 Beck back in the 19th century: Towards a genealogy of risk society *History and Technology* 23(4) 333–50

Guha R 1989a *The Unquiet Woods: Ecological Change and Peasant Resistance in Himalaya* University of California Press, Berkeley, CA

Guha R 1989b Radical American environmentalism and wilderness preservation: A third world critique *Environmental Ethics* 11 71–83

Hamilton C 2010 *Requiem for a Species: Why We Resist the Truth About Climate Change* Earthscan, London

Hamilton C 2013 *Earthmasters: the Dawn of the Age of Climate Engineering* Yale University Press, London

Hopkins R 2008 *The Transition Handbook* Greenbooks, Foxhole

Hornborg A and Crumley C eds 2006 *The World System and the Earth System* Left Coast Press, Walnut Creek, CA

Hornborg A 2013 *Global Ecology and Unequal Exchange* Routledge, London

Latour B 2004 *Politics of Nature: How to Bring the Sciences into Democracy* Harvard University Press, Cambridge, Mass.

Latour B 2013 *Facing Gaia* (http://www.bruno-latour.fr/sites/default/files/downloads/GIFFORD-SIX-LECTURES_1.pdf) Accessed 25 October 2014

Latour B 2011 Love your monsters, in Shellenberger M and Nordhaus T eds *Love your Monsters: Post-environmentalism and the Anthropocene* Breakthrough Institute, San Francisco 17–25

Locher F and Fressoz J-B 2012 The frail climate of modernity. A history of environmental reflexivity *Critical Inquiry* 38(3) 579–98

Lovelock J 2006 *The Revenge of Gaïa* Allen Lane, London

Lynas M 2011 *The God Species* Fourth Estate, London

Malm A and Hornborg A 2014 The geology of mankind? A critique of the Anthropocene narrative *The Anthropocene Review* 1(1) 62–9

Marvier M Lalasz R and Kareiva P 2012 Conservation in the Anthropocene (http://thebreakthrough.org/index.php/journal/past-issues/issue-2/conservation-in-the-anthropocene/) Accessed 25 October 2014

McNeill J 2000 *Something New Under the Sun: an Environmental History of the Twentieth-century World* Norton, New York

Merchant C 1980 *The Death of Nature: Women, Ecology and the Scientific Revolution* HarperCollins, San Francisco

Mitchell T 2011 *Carbon Democracy: Political Power in the Age of Oil* Verso, London

Moore J 2015 *Capitalism in the Web of Life* Verso, London

Neyrat F 2015 *Enquête sur la part inconstructible de la Terre* (forthcoming)

Perrier E 1913 Presidential address *Bulletin de la Société nationale d'acclimatation de France* 60

Peet R Robbins P and Watts M 2010 *Global Political Ecology* Routledge, London

Pomeranz K 2000 *A Great Divergence: China, Europe, and the Making of the Modern World Economy* Princeton University Press, Princeton

Robertson T 2012 *The Malthusian Moment: Global Population Growth and the Birth of American Environmentalism* Rutgers University Press, New Brunswick

Shellenberger M and Nordhaus T 2014 On Becoming an Ecomodernist. A Positive Vision of Our Environmental Future (http://thebreakthrough.org/index.php/voices/michael-shellenberger-and-ted-nordhaus/on-becoming-an-ecomodernist) Accessed 25 October 2014

Shellenberger M and Nordhaus T eds 2011 *Love your Monsters: Postenvironmentalism and the Anthropocene* Breakthrough Institute, San Francisco

Steffen W Crutzen P and McNeill J 2007 The Anthropocene: are humans now overwhelming the great forces of nature? *Ambio* 36(8) 614–21

Steffen W Grinevald J Crutzen P and McNeill J 2011a The Anthropocene: conceptual and historical perspectives *Philosophical Transactions of the Royal Society A* 369(1938) 842–67

Steffen W et al. 2011b The Anthropocene: From global change to planetary stewardship *AMBIO* 40 739–61

Tainter J 1988 *The Collapse of Complex Societies* Cambridge University Press, Cambridge

Tukker A et al. 2014 *The Global Resource Footprint of Nations* (http://exiobase.eu/). Accessed 25 October 2014

Wallerstein I 2004 *World-Systems Analysis: an Introduction* Duke University Press, Durham, NC